

In the claims:

Please amend the claims as follows:

Claims 1-12 (cancelled).

¹
(Currently Amended) ~~13~~. A process method for removing contaminants from a site, said contaminants including dissolved hydrocarbon products, said process method comprising:
injecting gas as bubbles including ozone gas under conditions to break carbon-carbon bonds in the contaminants in the site with injecting further comprising:

alternating water injection with bubble production to provide an even dispersion of bubbles, with the bubbles having a bubble diameter of less than about 200 microns, the contaminants being pulled into the bubbles to decompose the contaminants in a reaction in the bubbles in the presence of water.

C₁
²
(Previously added) ~~14~~. The method of claim ~~13~~¹ wherein the hydrocarbon products contaminants are dissolved chlorinated hydrocarbons and dissolved hydrocarbon petroleum products.

³
(Previously added) ~~15~~. The method of claim ~~13~~¹ wherein injecting gas as bubbles occurs through a microporous diffuser having 5-50 micron channel size resistance to flow over 1 to 3 psi, and with an annular pack of packing material.

⁴
(Previously added) ~~16~~. The method of claim ~~13~~¹ wherein injecting gas as bubbles occurs through a microporous diffuser disposed on end of a narrow diameter pipe riser to reduce the residence time in the riser volume.

⁵
(Previously added) ~~17~~. The method of claim ~~13~~¹ wherein injecting gas as bubbles occurs through a shielded microporous diffuser, which is injected into the site soil formation, the shielded diffuser having microporous material molded around an internal metal perforated tubing

and attached to an anchor which pulls the bubble generator out when the protective insertion shaft is retracted.

⁶
(Previously added) ~~18~~ The method of claim ~~13~~¹ further comprising:

pushing a shaft to a desired depth and inserting a bubble generator through the shaft the bubble generator having a molded tubing and the shaft having a drive detachable point, and pulling the shaft upwards, pulling off the detachable drive point and exposing the bubble generator.

⁷
(Previously added) ~~19~~ The method of claim ~~13~~¹ wherein alternating water injection with bubble production promotes continuous movement of microbubbles through porous aquifers.

⁸
(Currently Amended) ~~20~~ The method of claim ~~13~~¹ wherein alternating water injection with bubble production promotes continuous movement of microbubbles through a porous aquifers region of the site without coalescing or adhesion of microbubbles.

⁹
(Currently Amended) ~~21~~ The method of claim ~~13~~¹ wherein injected air/water bubbles move as a fluid through the a porous aquifer region of the site without fracturing or channeling in the aquifer to promote even distribution and efficiency of exchange of ozone with contaminants.

¹⁰
(Currently Amended) ~~22~~ The method of claim ~~13~~¹ wherein pulsing and injecting of gas/water are performed under conditions to move the bubbles on a pressure wave for lateral distribution in ~~the~~ a porous aquifer region of the site, with the pressure wave having an amplitude above a critical bubbling pressure and below a fracturing pressure for ~~the formation~~ the a porous aquifer region of the site.

¹¹
(Currently Amended) ~~23~~ The method of claim ~~13~~¹ wherein the method occurs in a well disposed in the site and pulsing comprises:

~~causing~~ causes re-circulation of water to assist in producing and promoting vertical lift adjacent the well.

(Currently Amended) ¹²~~24~~. A method conducted on a site having at least one well disposed through a ground formation, the method comprising:

producing microencapsulated ozone to enhance and promote an in-situ stripping of volatile organics while simultaneously terminating a normal reversible Henry's reaction.

(Previously added) ¹³~~25~~. The method of claim ¹²~~24~~ wherein microencapsulated ozone is microencapsulated in water, a gas/gas/water reaction is promoted for decomposition of highly volatile organic compounds by which ozone can react with carbon atom bonds to decompose molecules.

C1
cont.
(Previously added) ¹⁴~~26~~. The method of claim ¹²~~24~~ wherein the reaction is an aqueous remediation promoting simultaneous volatile organic compound in-situ stripping and gaseous decomposition, in the presence of water.

(Previously added) ¹⁵~~27~~. The method of claim ¹²~~24~~ wherein the bubbles substantially accelerate a transfer rate of volatile organic compounds from aqueous to gaseous state.

(Previously added) ¹⁶~~28~~. The method of claim ¹²~~24~~ wherein the ozone increase the rate of extraction by maintaining a low interior concentration of the volatile organic, while degrading the volatile organic by a gas/gas/water reaction.

(Previously added) ¹⁷~~29~~. The method of claim ¹²~~24~~ wherein ~~the~~ compounds treated include halogenated volatile organic compounds, vinyl chloride, and petroleum compounds.

(Currently Amended) ¹⁸~~30~~. The method of claim ¹²~~24~~ wherein ~~the~~ removal of contaminants occurs in saturated soils or unsaturated, but wet soils, without vacuum extraction to recover remaining solvents.

(Currently Amended) ¹⁹~~31~~ The ~~process~~ method of claim ¹²~~24~~ further comprising:
evaluating the site to identify contaminants present in the site and to match bubble size to
soil porosity characteristics of the site.

(Currently Amended) ²⁰~~32~~ The ~~process~~ method of claim ¹²~~24~~ further comprising:
installing a vertical injection well including a microporous diffuser coupled to a source of
air and ozone.

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cont.
(Currently Amended) ²¹~~33~~ The ~~process~~ method of claim ²⁰~~32~~ further comprising:
selecting of appropriate bubble size distribution to optimize gaseous exchange in the
bubbles; and
programming a wave form of pulsed gas/water injection according to site conditions
including porosity of surrounding site materials adjacent the microporous diffuser.

(Currently Amended) ²²~~34~~ The ~~process~~ method of claim ²⁰~~32~~ further comprising:
injecting and distributing microbubbles of the gas under pressure to provide a
recirculating a wave form to assist flow distribution in the site.

(Currently Amended) ²³~~35~~ The ~~process~~ method of claim ²⁰~~32~~ further comprising:
matching injection rates to soil conditions on the site to avoid fracturing of site materials
adjacent the microporous diffuser.

(Currently Amended) ²⁴~~36~~ The ~~process~~ method of claim ²⁰~~32~~ wherein the
microencapsulated ozone is provided as microfine bubbles having a diameter of less than about
200 microns of oxidizing gas to extract volatile dissolved hydrocarbons present in the site, while
the encapsulated ozone decomposes the volatile dissolved hydrocarbons by providing even
distribution of microbubbles into an aquifer having sand, which acts as a ~~with the~~ substrate
material acting as and ~~co-reactant~~ with the gas for decomposing the volatile dissolved
hydrocarbons in a gas/gas/water reaction.

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(Currently Amended) ~~37~~. An ~~sparging system~~ apparatus for in-situ removal of contaminants from soil and an associated subsurface groundwater aquifer at a site, the apparatus comprising:

a well;

microbubble generator, disposed in the well, to produce microbubbles for extracting contaminants from groundwater in a gas/gas/water reaction;

an ozone source coupled to the microbubble generator to produce microbubbles encapsulating ozone to enhance extraction of volatile dissolved contaminants for in-situ decomposition;

a pump for forming a pressure wave for assisting in dispersion flow of microbubbles;

C1
cont.
a co-reactant material to act as co-reactant with ~~the gas~~ ozone in the microbubbles for decomposing the contaminants in the gas/gas/water reaction; ~~0000~~

lateral dispersions for alternating pumping and bubble injection to maximize dispersal of microbubbles within and outward from the well ~~easing~~, and to provide a uniform dispersion of the microbubbles as bubbles as they bubbles travel through the site formation.

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(Previously added) ~~38~~. The apparatus of claim ~~37~~ ²⁷ further comprising:
packing material disposed about the microbubble generator having a porous structure matching the condition of porosity of the soil.

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(Previously added) ~~39~~. The apparatus of claim ~~37~~ ²⁷ further comprising:
remote sensing with pressure monitoring and groundwater sensing to remotely monitor and regulate mixing operation of the system.

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(Previously added) ~~40~~. The apparatus of claim ~~37~~ ²⁷ wherein the microbubble generator is a microporous diffuser having porosity matched to the soil porosity.

Please add new claims as follows:

(New) ³¹~~41~~ A method conducted on a site having at least one well disposed through a soil formation, the method comprising:

producing microencapsulated ozone and air as microfine bubbles having a diameter of 200 microns or less to promote decomposition of volatile organics according to a Criegee or Criegee-like reaction between ozone and the volatile organics while simultaneously terminating a normal reversible Henry's reaction.

C, (New) ³²~~42~~ The method of claim ³¹~~41~~ wherein ozone reacts with carbon atom bonds to
conf. decompose molecules.

(New) ²⁵~~43~~ The method of claim ¹²~~24~~ wherein the microbubbles enter the soil formation and travel through the soil formation.

(New) ²⁶~~44~~ The method of claim ¹²~~24~~ wherein ozone to air injected under pressure to overcome backpressure of the site.
